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National Welfare and Local Production by Multinational Enterprises

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NATIONAL WELFARE AND LOCAL PRODUCTION BY MULTINATIONAL ENTERPRISES

ABSTRACT

This paper examines the national welfare generated by five different modes of local production and how host governments regulate multinational enterprises' production activities in host countries. It has shown that the interest of the host government conflicts with that of an MNE. It is suggested that, in order to increase national welfare, the host government may encourage multiple licensing, and may set different royalty rate ceilings and periods of licensing for different industries.

The presence of multinational enterprises (MNEs) poses a dilemma to host governments [Caves 1982; Hymer 1970]. One the one hand, MNEs generate efficient allocations of resources and bring know-how and capital to host countries. On the other hand, host governments would like to reduce MNEs' excessive market power and gain a fair share of the benefits generated by their local operations. This dilemma leads to the need for appropriate commercial policies toward MNEs. A major concern is whether host governments should regulate entry by MNEs and, if so, in what manner. Research on the investment behavior of MNEs largely focuses on capital flow and trade pattern which result from policy instruments (e.g. taxes and tariffs) employed by host governments [e.g., Batra and Ramachandran 1980]. Not enough attention has been paid to the welfare implications of the modes of local production employed by MNEs.[1] MNEs can employ several modes to produce in a host country. For example, the MNE can fully own a local entity, share the ownership with local partners, or license its technology to local licensees. The welfare to host countries is different for each mode. This paper assesses the welfare generated by different modes of local production and discusses the actions host governments can take to increase gains from MNEs' operations.

In practice, host governments adopt a variety of actions to ensure that their economies benefit from MNEs' operations. These actions, including limitations on foreign ownership, royalty rates, and fixed terms for licensing agreements, force MNEs to reduce their payoffs from operating in the local economies if they decide to produce in host countries. This paper provides the theoretical underpinnings of these practices. We will show that the optimal mode of local production for MNEs is not the optimal one for host governments, and thus, it is justifiable for host governments to regulate MNEs' entry. This paper will also discuss counter strategies used by MNEs in responding to regulations imposed by host governments.

We will examine five modes which an MNE can adopt to produce in a host country: foreign direct investment (FDI), where an MNE fully owns a local entity; exclusive licensing (EL), where an MNE licenses its technology to one local entity; multiple licensing (ML), where an MNE licenses its technology to several local entities; joint venture (JV), where an MNE shares the ownership of a local entity with a partner; and a combination of joint venture and licensing (JVL), where an MNE shares the ownership of a local entity with a local partner and signs a licensing agreement with the local entity. We will derive the national welfare for each mode and demonstrate the preference of modes from the host government's perspective. To highlight the conflict between the MNE and the host government, the profit of each mode to the MNE is derived and compared with the preference of the host government. Unlike Bardhan[1982], this study provides analyses in

[1] Exceptions are Bardhan [1982] and Horstmann and Markusen [1987].

a dynamic context, covers more complicated entry modes, and considers MNEs' reactions to host government regulations.

The remainder of the paper is divided into three sections. Section I presents the model. Policy implications are discussed in section II. The third section provides the conclusions.

I. The Model

The host government is concerned with the long term pay-off it will receive from foreign firms' operations. We assume taxes away and define national welfare as total surplus: the sum of consumer surplus and local producer surplus. The present value of national welfare is

$$W = \int_0^\infty [CS(t) + PS(t)]e^{-rt}dt$$

where r is the discount rate, W is the discounted national welfare, and $CS(t)$ and $PS(t)$ stand for consumer surplus and producer surplus at time t respectively.

The above equation addresses a major difference between two kinds of entry modes: FDI, JV, and JVL on the one hand, and EL and ML on the other hand. When an MNE owns a local entity either completely (FDI) or holds no less than 50% of the equity as in the cases of JV and JVL, it will maintain effective control over the know-how and will receive pay-offs from the local entity for an unlimited period of time. On the other hand, when an MNE licenses its know-how in the host country, it is possible that local licensee(s) will be able to acquire the know-how and become independent after the licensing agreement(s) expires. Consequently, no pay-offs will be paid to the MNE from the local entity and national welfare will increase when the licensing agreement(s) is(are) no longer effective. For simplicity and without losing generality, this paper assumes that licensing expiration coincides with know-how independency.

The next step is to specify $CS(t)$ and $PS(t)$ under different modes of local production. We first construct a general model with varying equity holding and licensing fees. This model covers FDI, JV, EL, and JVL, and will be applied to the periods before and after licensing expiration. Then the case of multiple licensing is analyzed. Given the profit maximizing behavior of both the MNE and the local entity, the host government formulates its regulations.

We assume that the MNE in our analysis is a monopolist[2] (e.g. a pharmaceutical company with a patented drug) which faces a constant-elasticity demand function in the

[2] Our analyses also apply to the situation where an MNE becomes a monopolist after entering the host country.

host country as follows:

$$Q = P^{-\eta}, \eta > 1$$

where Q is the output, P is the price and η is the price elasticity of demand. We also assume that the production function exhibits a constant return to scale. Let c be the constant production cost and f be the unit royalty rate,[3] then the unit production cost of the local entity in the host country becomes $c + f$. Let $\alpha(0 \leq \alpha \leq 1)$ be the equity held by the MNE and V be the profit of the local venture. Because local producer surplus is the local investors' share of the profit of the local entity, the local producer surplus is $(1 - \alpha)V$. Without host government restrictions, the MNE controls price, output level, α, and f. But for EL, the MNE controls only f and the local licensee maximizes its profits given f and the demand function.

It can be shown that, as long as the licensing agreement is effective and the MNE owns α of the local entity, the instantaneous national welfare is

$$(1) \qquad W = \frac{(c+f)^{1-\eta}}{\eta - 1}((1-\alpha)(\frac{\eta - 1}{\eta})^{\eta} + (\frac{\eta}{\eta - 1})^{1-\eta})$$

For notation simplification, we define $\omega = \frac{1}{\eta - 1}(\frac{\eta c}{\eta - 1})^{1-\eta}$. For FDI, $\alpha = 1$ and $f = 0$, thus national welfare is $W_{FDI} = \int_0^{\infty} \omega e^{-rt} dt$. Assuming that the MNE's equity holding is 50%, which is the maximum permissible foreign ownership in many countries [United Nations Centre on Transnational Corporations 1983], national welfare of JV is equal to $W_{JV} = \int_0^{\infty} \omega(\frac{3\eta - 1}{2\eta}) e^{-rt} dt$. National welfare is more complicated in the cases of JVL and EL. In the JVL case, even though the host government can restrict foreign ownership, national welfare will depend on the trade-off between equity holding and licensing fees made by the MNE. In the EL case, the host government needs to consider the impact on welfare after the licensing agreement expires.

In the JVL case, the MNE receives pay-offs from equity ownership as well as from the licensing agreement. The MNE chooses f and α to maximize its profit. In order to evaluate the effects of regulations, it is necessary to understand how the regulations on f and α affect the profit of the MNE and the MNE's likely responses. Let π represent the present value of the MNE's profit, then

$$(2) \quad \pi = \int_0^{\infty} (\alpha * V + f * Q) e^{-rt} dt = \frac{1}{r}[\alpha(c+f)^{1-\eta}\eta^{-\eta}(\eta - 1)^{(\eta - 1)} + f * (\frac{\eta}{\eta - 1}(c+f))^{-\eta}]$$

[3] If we allow a two-part tariff for licensing fees, the case will be trivial. Given that many host governments restrict licensing fees, we assume this trivial case does not exist. One could also argue that an MNE does not explicitly have to charge a licensing fee in this case because it can build the licensing fee into the price of semi-finished products sold to the venture. To achieve this goal, there have to be some tie-in agreements between the MNE and the venture. However, host governments usually restrict this practice [UNIDO 1978].

Since π is an increasing function of α, regardless of f, the MNE will try to hold as much equity of the local entity as it can. Therefore, in the absence of host government regulations, the MNE will adopt FDI.[4] If the host government sets a limitation on the equity share held by foreign firms, the MNE needs to decide on the optimal f. On the one hand, a high f will increase licensing income to the limit that the demand function allows. On the other hand, a high f will reduce the local venture's profit and thus decrease the equity income of the MNE. The optimal f can be obtained from the first order condition of equation (2), which is

$$f = \frac{c(1-\alpha)}{\eta + \alpha - 1} \tag{3}$$

Equation (3) reveals the trade-off between α and f for the MNE. Substituting (3) into (1), assuming that $\alpha = 0.5$, the national welfare of JVL is $W_{JVL} = \int_0^\infty \omega \frac{3\eta-1}{2\eta}(\frac{2\eta}{2\eta-1})^{1-\eta} e^{-rt} dt$.

In the case of EL in which the MNE licenses its know-how exclusively to a local firm (i.e., $\alpha = 0$), the optimal unit royalty rate is $f = \frac{c}{\eta-1}$. As discussed before, national welfare will change after the expiration of the licensing agreement. Let T be the number of years the licensing agreement is effective and assume that after T years, the local licensee acquires the know-how. Consequently, the MNE will not receive any royalty payments from the local entity. Hence after T, the exclusive licensee becomes a monopolist and national welfare for each period under EL is $\omega(1+\frac{\eta-1}{\eta})$. Therefore, the discounted national welfare of EL, W_{EL}, is $\int_0^T \omega(\frac{\eta}{\eta-1})^{-\eta}\frac{2\eta-1}{\eta-1}e^{-rt}dt + \int_T^\infty \omega(1+\frac{\eta-1}{\eta})e^{-rt}dt$.

The MNE can also license its technology to a number of local firms. It has to decide how many firms it wants to license to and the unit royalty rate it wants to charge. We assume that after multiple licensing, the market reaches a Cournot equilibrium. If the MNE licenses to n local firms, the profit of the MNE is $\pi_{ML} = \int_0^T c^{1-\eta}\eta^{-\eta}(\eta-1)^{\eta-1}(1-\frac{1}{n\eta})^{\eta}e^{-rt}dt$. Because this profit is an increasing function of n, the MNE will try to license to as many licensees as possible.[5] As $n \to \infty$, the national welfare is ω. After T years, as the

[4] MNEs' preference of FDI over other entry modes seems to be consistent with the findings of other studies. Davidson and McFetridge [1985] found that firms prefer FDI to EL when there are no government restrictions on their entry. Stopford and Wells [1972] also found that firms usually prefer FDI to licensing or to other strategies to serve foreign markets. Teece [1981, 1986] has suggested that FDI has a lower transaction cost than EL for the transfer of complex technologies abroad and thus is preferred by MNEs.

[5] The national welfare is also an increasing function of n. Since the interest of the MNE is consistent with that of the host government, there is no need to regulate the number of licensees.

licensees acquire the know-how, the local market becomes competitive and the national welfare becomes $\omega(\frac{\eta}{\eta-1})^{\eta-1}$ for each period. Thus, the discounted national welfare is $W_{ML} = \int_0^T \omega e^{-rt}dt + \int_T^\infty \omega(\frac{\eta}{\eta-1})^{\eta-1}e^{-rt}dt$.

Having derived national welfare under different modes of local production in the host country, we will draw a number of policy implications. We will first compare the preference of the host government to that of the MNE and then discuss how host government should regulate the production activities of MNEs.

II. Policy Implications

Proposition 1: The preference of national welfare is characterized as follows:

$$(i) W_{ML} > W_{EL}$$

$$(ii) W_{ML} > W_{FDI}$$

and

$$(iii) W_{JV} > W_{FDI} > W_{JVL}$$

Proof: The proofs of (i) and (ii) are straightforward.[6] For (iii), since $\frac{W_{JV}}{W_{FDI}} = \frac{3\eta-1}{2\eta} > 1$, $W_{JV} > W_{FDI}$. The remaining question is whether $W_{JVL} > W_{FDI}$. We use Cauchy-Schwarz inequality to show that $\frac{W_{JVL}}{W_{FDI}} < 1$.

First, the welfare ratio is $\frac{W_{JVL}}{W_{FDI}} = \frac{3\eta-1}{2\eta}(\frac{2\eta-1}{2\eta})^{\eta-1}$. Let $\eta = \frac{n}{m}, n > m$, then

$$(3\eta-1)\frac{(2\eta-1)^{\eta-1}}{(2\eta)^{\eta}} = \left(\frac{(3\eta-1)^m(2\eta-1)^{n-m}}{(2\eta)^n}\right)^{\frac{1}{m}}$$

Let $a_i = \frac{3\eta-1}{2\eta}$ for $1 \le i \le m$, and $a_j = \frac{2\eta-1}{2\eta}$ for $m+1 \le j \le n$. Since $\sqrt[n]{a_1 a_2 a_3 \cdots a_n} \le \frac{a_1+a_2+\cdots+a_n}{n}$,

$$\begin{aligned}(3\eta-1)\frac{(2\eta-1)^{\eta-1}}{(2\eta)^{\eta}} &\le (\frac{(3\eta-1)m+(2\eta-1)(n-m)}{2n\eta})^{\eta} \\ &= (\frac{(3\frac{n}{m}-1)m+(2\frac{n}{m}-1)(n-m)}{2\frac{n^2}{m}})^{\eta} \\ &= 1\end{aligned}$$

Thus, $W_{FDI} > W_{JVL}$. Therefore,

$$W_{JV} > W_{FDI} > W_{JVL}$$

[6] See Bardhan [1982] for the proof that $(\frac{\eta}{\eta-1})^{-\eta}\frac{2\eta-1}{\eta-1} < 1$.

From (i), (ii), and (iii) we know that depending upon r, T, and η, either $W_{JV} > W_{ML} > W_{FDI} > W_{JVL}$ or $W_{ML} > W_{JV} > W_{FDI} > W_{JVL}$. For example, assuming $r = 0.10$, simulation results show that unless the licensing period is extremely long (over twelve years), the national welfare resulting from multiple licensing is greater than that from joint venture.

Generally speaking, the higher the discount rate, and the longer the licensing period, the less beneficial the licensing mode (EL or ML) is to the host country. Similarly, the higher the η, from equation 3, the lower the unit royalty rate compared to cost, and consequently the more beneficial the mode is to the host country.

The comparison between EL and, FDI, JV and JVL is not conclusive. Taking EL and FDI as an example, Figure 1 presents the combinations of T and η which favor EL (the zone under EL), and these combinations favor FDI (the zone under FDI). The line in Figure 1 represents the indifference curve for the host government to either FDI or EL. It shows that, for $\eta > 2$, it is likely that exclusive licensing is preferred over FDI.[7] This result contradicts that of Bardhan [1982]. The main difference is that Bardhan assumes perpetual licensing, where a licensing agreement lasts forever.[8] We have posited a dynamic framework and incorporated the technological independence of host country firms into the model.

Insert Figure 1 here

The pay-offs to the MNE under different modes of local production in the host country is the share of its profit from the local entity and/or licensing income. The discounted profits of FDI, JV, and JVL can be easily derived from equation (2). For example, if the MNE adopts the JVL mode and $\alpha = 0.5$, then, $f = \frac{c}{2\eta - 1}$. From equation (3), $\pi_{JVL} = \int_0^\infty c^{1-\eta} \frac{1}{\eta - 1} (\frac{\eta}{\eta - 1})^{-\eta} (\frac{2\eta}{2\eta - 1})^{-\eta} e^{-rt} dt$. If the MNE licenses its know-how exclusively to one local firm, $\alpha = 0$, the optimal unit royalty rate is $f = \frac{c}{\eta - 1}$. Since the licensing agreement will expire after year T, $\pi_{EL} = \int_0^T fQe^{-rt} dt = c^{1-\eta} \eta^{-2\eta} (\eta - 1)^{(2\eta - 1)} (1 - e^{-rT})$. Similarly,

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[7] If the corporate income tax rate in the host country is higher than the royalty withholding tax rate, FDI will be more beneficial to the host country.

[8] Under perpetual licensing, it is easy to show that

$$W_{JV} > W_{FDI} = W_{ML} > W_{JVL} > W_{EL}.$$

the profit of multiple licensing when $n \to \infty$ is $\pi_{ML} = c^{1-\eta}(\eta^{-\eta})(\eta-1)^{\eta-1}(1-e^{-rT})$. Based upon the profit of different entry modes, we derive Proposition 2.

Proposition 2: In the long run, FDI yields the highest discounted profit and EL results in the lowest discounted profit. Superiority among ML, JV, and JVL in the long run depends on rT and η.

(i) *If* $rT > -\ln(1-(\frac{2\eta}{2\eta-1})^{-\eta})$, *then* $\pi_{ML} > \pi_{JVL} > \pi_{JV}$

(ii) *If* $-\ln(1-(\frac{2\eta}{2\eta-1})^{-\eta}) > rT > \ln 2$, *then* $\pi_{JVL} > \pi_{ML} > \pi_{JV}$

(iii) *If* $\ln 2 > rT$, *then* $\pi_{JVL} > \pi_{JV} > \pi_{ML}$

Proof: First, we will show that FDI is the dominant mode. Since $1-e^{-rT} < 1$, $\frac{\pi_{FDI}}{\pi_{ML}} = (1-e^{-rT})^{-1} > 1$. Also, $\frac{\pi_{FDI}}{\pi_{EL}} = (1-\frac{1}{\eta})^{-\eta}(1-e^{-rT})^{-1} > 1$. In addition, $\frac{\pi_{FDI}}{\pi_{JV}} = 2$ and $\frac{\pi_{FDI}}{\pi_{JVL}} = (1-\frac{1}{2\eta})^{-\eta} > 1$. Thus, FDI is the dominant mode in the long run.

Next, we will show that $\pi_{JVL} > \pi_{JV} > \pi_{EL}$. The profit ratio of JVL to JV is $\frac{\pi_{JVL}}{\pi_{JV}} = 2(1-\frac{1}{2\eta})^{\eta}$. Since $\eta > 1, (1-\frac{1}{2\eta})^{\eta} > \frac{1}{2}$, then $\frac{\pi_{JVL}}{\pi_{JV}} > 1$.

It remains to compare the EL and JV entry modes. The profit ratio is $\frac{\pi_{JV}}{\pi_{EL}} = \frac{1}{2}(\frac{\eta}{\eta-1})^{\eta}(\frac{1}{r}-\frac{e^{-rT}}{r})^{-1}$. Since $(\frac{\eta}{\eta-1})^{\eta} > e > 2$, $\pi_{JV} > \pi_{EL}$. Thus, $\pi_{FDI} > \pi_{JVL} > \pi_{JV} > \pi_{EL}$. The next question is the order of π_{ML} relative to the discounted profit of other modes.

We first compare the discounted profit of ML to that of JVL. The profit ratio is $\frac{\pi_{ML}}{\pi_{JVL}} = (\frac{2\eta}{2\eta-1})^{\eta}(1-e^{-rT})$. If $\pi_{ML} > \pi_{JVL}$, then $(1-e^{-rT}) > (\frac{2\eta}{2\eta-1})^{-\eta}$, which is equivalent to $rT > -\ln(1-(\frac{2\eta}{2\eta-1})^{-\eta})$. Thus, if $rT > -\ln(1-(\frac{2\eta}{2\eta-1})^{-\eta}), \pi_{FDI} > \pi_{ML} > \pi_{JVL} > \pi_{JV} > \pi_{EL}$.

If $rT < -\ln(1-(\frac{2\eta}{2\eta-1})^{-\eta})$, we need to compare π_{ML} to π_{JV}. The profit ratio is $\frac{\pi_{ML}}{\pi_{JV}} = 2(1-e^{-rT})$. Obviously, if $rT > \ln 2, \pi_{ML} > \pi_{JV}$. Thus, if $-\ln(1-(\frac{2\eta}{2\eta-1})^{-\eta}) > rT > \ln 2, \pi_{FDI} > \pi_{JVL} > \pi_{ML} > \pi_{JV} > \pi_{EL}$.

Since $\pi_{ML} > \pi_{EL}$ and if $rT < \ln 2, \pi_{FDI} > \pi_{JVL} > \pi_{JV} > \pi_{ML} > \pi_{EL}$.

In conclusion, FDI is the mode of local production most preferred by the MNE. The order of preference of the rest of the modes depends on rT as compared to $\ln 2$ and $-\ln(1-(\frac{2\eta}{2\eta-1})^{-\eta})$. In any case, EL generates the smallest discounted profit.

Propositions 1 and 2 indicate the conflict of interest between the MNE and the host government. For example, if $r = 0.10$ and $T < 6.9$, the MNE's preference is represented as

$$\pi_{FDI} > \pi_{JVL} > \pi_{JV} > \pi_{ML} > \pi_{EL}$$

while the host government's preference is represented as

$$W_{ML} > W_{JV} > W_{FDI} > W_{JVL}$$

The host government prefers multiple licensing and joint venture while the MNE desires a wholly-owned subsidiary or a joint venture with a licensing agreement. Because of this conflict of interests, there is a need for host government regulations. In fact, as shown in equation (1), national welfare decreases with α and thus it is in the interest of the host government to restrict foreign ownership. This conclusion justifies the common practice of limitation of foreign ownership in host countries. Korea and India, for example, all have local ownership requirements for foreign subsidiaries.

However, an MNE can counter the regulations of foreign ownership by adopting a JVL mode. If the host government requires local ownership, the MNE can increase its profit by applying equation (3), as graphed in Figure 2 for $\eta = 2$ and 3 for a given equity holding. In Figure 2, if the MNE is allowed to hold no more than α_1 equity, the MNE will respond by charging f_1 unit royalty rate and thus reduce the effectiveness of the ownership regulation. Therefore, the host government may want to set a royalty rate ceiling to ensure its share of the pay-off from the MNE's local operations.

For example, the host government may set a royalty rate ceiling, f_2, in connection with the local ownership requirement $(1-\alpha_1)$. Since the profit of the MNE is an increasing function of α, the MNE will hold the maximum allowable equity share, α_1 and will charge f_2 as the unit royalty rate if $\eta = 2$. However, the host government should not impose unnecessary regulations such as the dual regulations α_1 and f_2 when $\eta = 3$ as shown in Figure 2. In this case, the optimal royalty rate is f_3, which is *lower* than the royalty rate ceiling. Therefore, the policy implication for the host government is that it should set different royalty rate ceilings for industries with different demand elasticities. The host government has another alternative to avoid the manipulation of equity holding and royalty rates by the MNE: banning the simultaneous use of joint venture and licensing agreements. The member countries of Andean Common Market, for example, prohibits royalty payments from affiliates to foreign parents [Grosse 1980].

Insert Figure 2 here

The host government should also encourage multiple licensing which will eventually create a competitive market.[9] In most developing countries there are no governmental restrictions on multiple licensing, and it is felt exclusivity as a matter of negotiation between foreign firms and local firms [UNIDO 1978]. Two special cases are Japan and India,

[9] To implement this policy, for example, the host government may require foreign licensors to license to any local firm which is interested in the technology.

with the former discouraging multiple licensing at one time and the latter encouraging it currently [Contractor 1985; UNIDO 1978].

The policy of encouraging multiple licensing may be difficult to carry out. In our model, national welfare will increase when the number of local licensee is large. This indicates two potential problems: the existence of a large number of potential buyers of foreign technology and no abnormal profits for licensees when many of them sign licensing agreements with a foreign firm. If multiple licensing is not feasible in the host country, the host government should encourage exclusive licensing if the period of licensing is short and encourage joint venture if the period of licensing is long. Since the complexity of technology affects the period of licensing, the implication is that for less complex technologies which can be mastered by local firms within a short period of time, the government should strengthen the bargaining position of local firms and enhance national welfare by limiting the period of licensing and prohibiting FDI and JVL. However, when complex technologies are involved, host governments should encourage joint ventures and should not set unrealistic restrictions on the period of licensing. Some host governments do carry out this policy. For example, Korea normally limits the period of licensing to five years, but the term can be extended if an advanced technology is involved [UNIDO 1978]. Because royalty rate ceilings depend on demand elasticities and because restrictions on the period of licensing depend on the complexity of technology, it is understandable that some host governments review licensing agreements between foreign and local firms on a case by case basis.

In summary, the above discussion provides a theoretical rationale for host governments to set restrictions on MNEs' mode of local production. The combination of different forms of restrictions, such as foreign ownership, royalty rates, and period of licensing agreement, can increase national welfare.

III. Conclusions

This paper examines the national welfare generated by five different modes of local production and how host governments regulate MNEs' production activities in host countries. It has shown that the interest of the host government conflicts with that of an MNE. Consequently, interventions in the entry of MNEs are legitimate. It is suggested that, in order to increase national welfare, the host government may encourage multiple licensing, and may set different royalty rate ceilings and periods of licensing for different industries.

Our analyses can be extended to study whether host governments should ban MNEs' entry completely when they face an existing but inefficient local producer.[10] The main reason for banning foreign entry is that although the efficient foreign producer can increase

[10] For example, if the entry of MNE · results in the replacement of the existing inefficient

consumer surplus, it may not offset the loss of local producer surplus incurred by the inefficient local monopolist. The above model can also be expanded to study the extent of foreign ownership restrictions in exchange for exporting.

While regulations on MNEs set by host governments can increase national welfare, they may be countered by retaliations from other countries. The policy implications proposed above seem to be more applicable to less developed countries where retaliations do not cause great damage. Finally, pitfalls regarding total surplus analysis certainly apply to our findings.

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producer, it can be shown that if $c' < (\frac{4\eta-2}{3\eta-1})^{\frac{1}{\eta-1}} c$, where c' is the local unit production cost, the host government should ban foreign entry through JV. If $c' < (\frac{\eta}{2\eta-1})^{\frac{1}{\eta-1}} c$, the host government should ban foreign entry through FDI.

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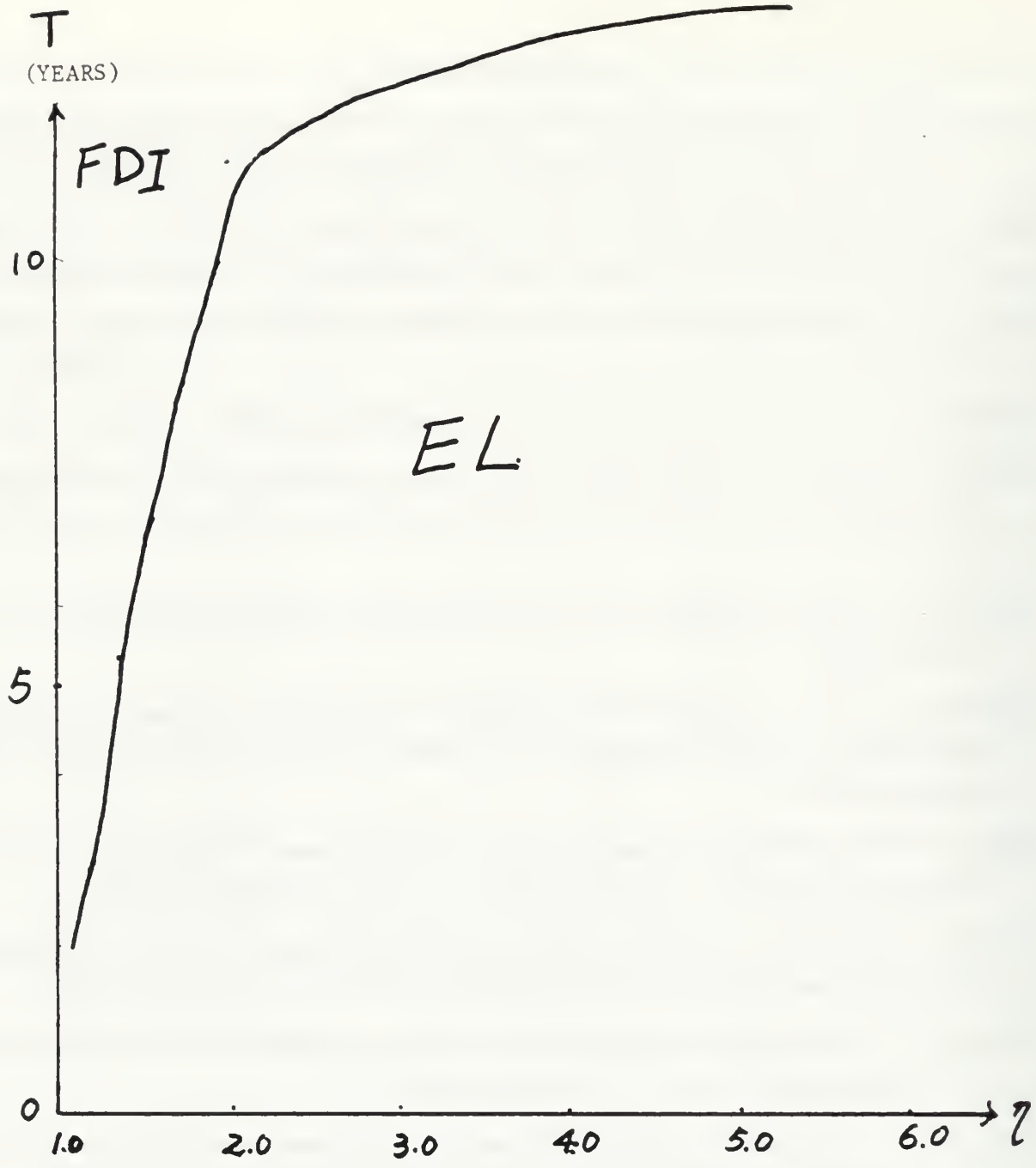

Figure 1 Preference of Host Governments
(r=0.10)

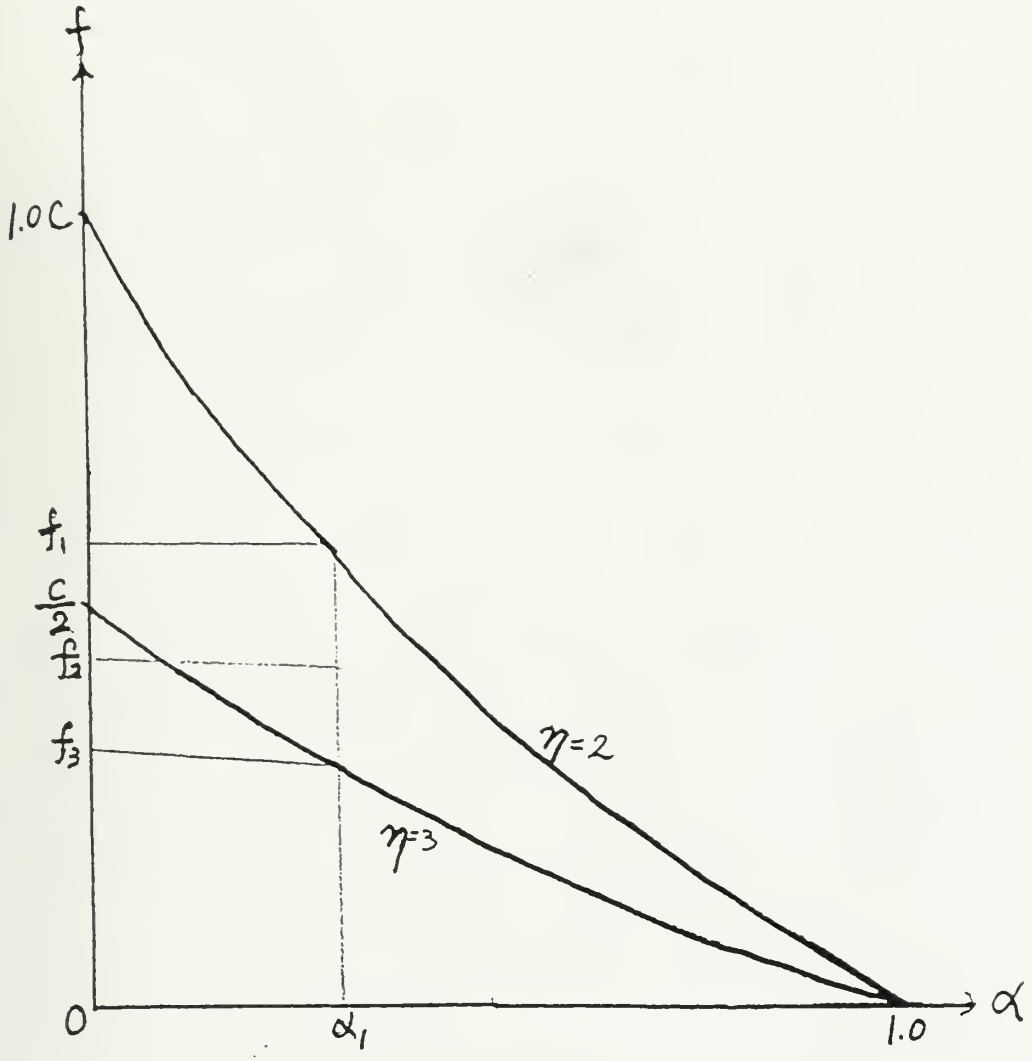

Figure 2 Relationship between Equity Holding (α) and Unit Royalty Rate (f) with $\eta=2$ and $\eta=3$

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